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Docket No.: 4100-0140PUS1  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of:  
Günther KLAGÉ

Application No.: 10/549,940

Confirmation No.: 6038

Filed: September 20, 2005

Art Unit: 2816

For: FREQUENCY SYNTHESISER ACCORDING  
TO THE DIRECT DIGITAL SYNTHESIS  
METHOD

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Examiner: Not Yet Assigned

**LETTER**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Subsequent to the filing of the above-identified application on September 20, 2005, attached hereto is an English translation of the International Preliminary Examination Report (Form PCT/IPEA/409) that should be made of record in the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or to credit any overpayment to Deposit Account No. 02-2448 for any

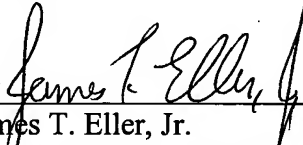
Application No.: 10/549,940

Docket No.: 4100-0140PUS1

additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Dated: September 18, 2006

Respectfully submitted,

By 

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Attachment(s)

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

**TRANSLATION**

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year) **See form PCT/ISA/210**

Applicant's or agent's file reference <b>P28435/WO Kf</b>		<b>FOR FURTHER ACTION</b> See paragraph 2 below	
International application No. <b>PCT/EP2004/011932</b>	International filing date (day/month/year) <b>21.10.2004</b>	Priority date (day/month/year) <b>05.11.2003</b>	
International Patent Classification (IPC) or both national classification and IPC <b>G06F1/03</b>			
Applicant <b>ROHDE &amp; SCHWARZ GMBH &amp; CO. KG</b>			

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

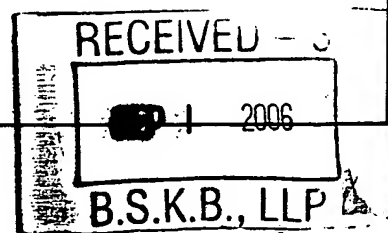
If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.



# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference P28435/WO Kf	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/EP2004/011932	International filing date ( <i>day/month/year</i> ) 21 October 2004 (21.10.2004)	Priority date ( <i>day/month/year</i> ) 05 November 2003 (05.11.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant ROHDE & SCHWARZ GMBH & CO. KG		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 <i>bis</i> .1(a).																								
2.	This REPORT consists of a total of 9 sheets, including this cover sheet.  In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application
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4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

<p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p>	<p>Date of issuance of this report 27 July 2006 (27.07.2006)</p> <p>Authorized officer  <div style="text-align: center; font-weight: bold;">Ellen Moyse</div></p> <p>e-mail: pt05@wipo.int</p>
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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2004/011932

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language  
\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	3-14	YES
	Claims	1, 2	NO
Inventive step (IS)	Claims	7-14	YES
	Claims	1-6	NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO
2. Citations and explanations:			
1. Reference is made to the following documents:			
D1: US 4 901 265 A (KERR RICHARD J ET AL.) 13 February 1990 (1990-02-13)			
D2: US.2002/057733 A1 (SULLIVAN MARK C) 16 May 2002 (2002-05-16)			
D3: LEYONHJELM S A ET AL.: "AN EFFICIENT IMPLEMENTATION OF BANDLIMITED DITHERING" WIRELESS PERSONAL COMMUNICATIONS, KLUWER ACADEMIC PUBLISHERS, NL, vol. 8, no. 1, August 1998 (1998-08), pages 31-35, XP000765354 ISSN: 0929-6212			
D4: EP 0 823 700 A (NDS LTD) 11 February 1998 (1998-02-11)			
2. INDEPENDENT CLAIM 1			
The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 1 is not novel within the meaning of PCT Article 33(2). Document D1 discloses (the references between parentheses relate to this document)			

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

a frequency synthesizer based on the direct digital synthesis method (figure 1), having  
a phase accumulator (12) for cyclically incrementing a phase signal by a phase increment which is applied to the input of the phase accumulator (column 5, lines 16-17),  
a memory unit (16) with a table of sine function values, which is stored in the memory unit's memory cells, for ascertaining sine function values which correspond to phase values of the phase signal (column 5, lines 17-23, column 4, line 63 - column 5, line 2),  
a digital/analogue converter (18) for converting the discrete-time sine function values into a more or less analogue, sinusoidal time function (column 5, lines 23-26, 31-33) and  
an anti-aliasing low-pass filter (20) for smoothing the more or less analogue sinusoidal time function, where  
the discrete-time sine function values are overlaid with a nonperiodic signal (column 6, lines 6-15) in an adding unit (28) which is connected between the memory unit (16) and the digital/analogue converter (18).

The subject matter of claim 1 is therefore not novel.

3. DEPENDENT CLAIMS 2-6

Claims 2-6 do not contain any features which, in

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

combination with the features of any claim to which they refer, meet the PCT requirements for novelty and inventive step.

- 3.1 The additional feature of claim 2 is known from D1 (figure 1, column 6, lines 6-15). The subject matter of claim 2 is therefore not novel.
- 3.2 Document D2 (figure 8, paragraph 49) describes the same advantages as the present application for the additional feature of claim 3. A person skilled in the art would therefore consider the inclusion of this feature in the frequency synthesizer described in D1 as a usual measure for achieving the object in question.
- 3.3 The additional features of claim 4, apart from the clocking of the adding unit, are known from D1 (figure 1, column 5, lines 26-30). The clocking of the adding unit relates to a minor structural change which a person skilled in the art would strive to achieve on the basis of familiar considerations, especially since the advantages which can be attained thereby are readily foreseeable. Hence, although the subject matter of claim 4 is novel, it is not based on an inventive step.
- 3.4 The subject matter of claims 5 and 6 is novel, but there is no underlying inventive step because their additional features have no technical effect which is identifiable for the entire scope of the claims.



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INTERNATIONAL SEARCHING AUTHORITY

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

It is noted that these features are known both *per se* (D4, figure 2, column 2, line 55 - column 4, line 8) and in combination with bandpass-filtered noise with the same purpose (D3, page 31, "Introduction"; figure 1).

4. DEPENDENT CLAIMS 7-14

The combination of features contained in the dependent claims is neither known from nor suggested by the present prior art. The reasons for this are as follows:

- 4.1 Document D1, which is regarded as the closest prior art, discloses (see above) a frequency synthesizer from which the subject matter of claim 7 differs essentially in the additional features of claims 5 and 7. However, it does contain a pseudo-noise generator.

The subject matter of claim 7 is therefore novel (PCT Article 33(2)).

- 4.2 Not all of the novel features have a technical effect which is identifiable for the entire scope of the claim. The technical problem addressed by the present invention can be considered that of generating a noise signal without DC component and a component in the useful band.

The solution proposed for this problem in claim 7 of the present application does involve an inventive

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INTERNATIONAL SEARCHING AUTHORITY

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

step (PCT Article 33(3)) for the following reasons:

A person skilled in the art would not solve the problem of avoiding a DC component by using a differentiator, because this is usually considered to be a problem which is related to the signal at the input of the D/A converter and hence is solved at the input or at the output of the D/A converter. On the other hand, a DC component is usually avoided by subtracting the measured or predicted DC component. Differentiation of the (bandpass-filtered) noise signal is not obvious, particularly because the prior art does not provide any reference in this direction. Advantageously, this differentiation can be combined very well with the interpolating nonrecursive filters.

4.3 Claims 8-14 are dependent on claim 7 and therefore likewise meet the PCT requirements for novelty and inventive step.

5. The subject matter of claims 1-14 relates to the technical field of frequency synthesis and therefore meets the criteria of industrial applicability (PCT Article 33(4)).

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 5 refers to claim 4. The feature to which reference is made ("the noise signal bandpass-filtered in the audio frequency range") is found in claim 3, however, not in claim 4.

The statement in box V has been made under the assumption that claim 5 is dependent on claim 3.